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EXAMINER

MERSHON, JAYNE L

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/587,557	Applicant(s) MORGENSTEIN, HAIM	
	Examiner Jayne Mershon	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :8/2/2007, 4/5/2007, 9/11/2006, 7/31/2006.

DETAILED ACTION

Status of Claims

Claims 1-21 are pending and examined below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 4 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant does not distinguish whether the inlet and outlet conduits are those of the inlet to the HAC and outlet to the HDC or the opposite so there is a lack of antecedent basis. In addition, the limitation that the inlet conduit is connected above and below the outlet conduit is indecipherable. In the specification, the description is referring to the schematic of fig. 5 (see paragraph [0131]). The examiner is unable to relate the words to the actual device of fig. 6 and therefore, the description is unclear and does not claim what the applicants regards as their invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 1-9 and 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Redman, (U.S. Pat. No. 4,064,409) in view of George, Jr. (U.S. Pat. 6,651,433).

Regarding claim 1, Redman teaches a ferrofluidic converter for generation of electricity comprising:

a) A main circuit (101) (see fig. 4), comprising:

a. 1) A Heat Absorbing Container (HAC) (109), having an inlet, i.e. liquid return or porous wick (107), connected to the first end of an inlet conduit, and a first outlet, i.e. opening to venturi valve (103) and pipes (112), connected to a first end of an outlet conduit; wherein said inlet conduit, said outlet conduit, and said HAC connected to an external heat source to heat said ferrofluid and said carrier gas (see col. 3, lines 11-29);

a. 2) An elongate Heat Dissipating Container (HDC) (106) having an inlet, i.e. other end of venturi (103), connected to the second end of said outlet conduit, and an outlet, i.e. liquid return, connected to the second end of said inlet conduit; wherein said

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HDC that dissipates heat to an external heat sink, thereby cooling said ferrofluid and said carrier gas (see col. 3, lines 20-29).

d) a first one-way control device, i.e. porous wick (107), connected at said inlet of said HAC for allowing ferrofluid to flow only in a direction from said outlet of said HDC to the inlet of said HAC, as a result of the difference in pressure in said HAC and in said HDC (see col.3, lines 26-29);

e) a one-way control device, i.e. venturi, connected at said inlet of said HDC for allowing ferrogas to flow only in a direction from said first outlet of said HAC to the inlet of said HDC, as a result of the difference in pressure in said HAC and in said HDC (see col. 3, lines 13-15);

g) magnetic field generation elements, i.e. toroidal magnet (103) for generating magnetic fields around selected sections of said inlet conduit and said outlet conduit; said magnetic fields having direction and sufficient strength such that the individual magnetic fields of essentially all of said magnetic particles will be aligned by said generated fields when said particles move through said selected sections of said conduits (see col. 3, lines 30-34); and

h) electricity conducting wires, i.e. solenoid (105), coiled around said selected sections of said inlet conduit and said outlet conduit, wherein electric current is induced in the coils of said wires by said aligned magnetic fields of said magnetic particles moving through said coils of said wires (see col. 3, lines 47-50).

Redman does not specifically teach b) a reservoir container, connected by a conduit to the outlet of said HDC; said reservoir allowing exchange of ferrofluid stored in said reservoir container with said main circuit. The reservoir is simply a larger heat exchanger portion. It is a change of configuration of the condenser/heat exchanger. The fact that a part of the loop is called

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the HDC and another part is called a reservoir does not change the function of the heat exchanger/condensor. For example, in fig. 6 of applicant's specification, the conduit routing simply results in 3 heat exchangers connected in a primarily parallel configuration, but the function remains the same.

It is the examiner's position that the difference between the condensor taught in Redman and the condensor plus reservoir recited is simply making the reservoir separable from the main circulation system, rather than integral. The court has ruled that making a device integral or separable is a matter of engineering choice (see MPEP § 2144.04 V).

Therefore it would be obvious to a person of ordinary skill in the art to modify the reservoir in the cited embodiment of Redman by creating a second distinct reservoir for the condensor because having a second heat exchanger rather than a larger first heat exchanger. results in the predictable result of both designs functioning as a source of condensed ferrofluid.

In the alternative, George, Jr. does teach a heater/compressor (86, 91, and 95) (HAC), an expander (similar to venturi) and a heat exchanger (40) (HDC), that uses a reservoir of cooler liquid, i.e. the fluid from heater 44, to cool a stream of gas or liquid, i.e. from fluid exiting thermal battery (see col. 8, lines 2-5) entering expander. George, Jr. teaches the use of the reservoir is to cool the fluid stream (see col. 8, lines 2-5).

Therefore it would be obvious to a person having ordinary skill in the art to modify the fluid stream into the HDC of Redman by using cooled liquid from a reservoir because the cool liquid from the reservoir would lower the temperature of the fluid stream assuring condensation.

Redman also does not teach the control devices of sections d) and e) above are valves and also does not teach additional valves as follows:

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c) valves, for timely opening and closing said first outlet of said HAC and said outlet of said HDC and the inlet/outlet of said reservoir container; and

f) control means, for timely operating said valves;

George, Jr. does teach a generator that uses the timely opening and closing of valves, for forcing pressurization and thereby heating followed by expansion and cooling (see col. 8, lines 26-43).

It is the examiner's position that Redman uses heating and cooling to affect a self-pumping system (see col. 2, line 36 through col. 3, line 2). The applicant added valves as taught in George, Jr. to control flow in order to use a batch process instead of a continuous self-pumping operation (see applicant's specification paragraph [0102]). George, Jr. teaches the use of valves to control flow and force fluid movement due to expansion (see col. 8, lines 26-43). It is the examiner's position that George, Jr. uses a closed loop system to generate electricity similar to Redman and the instant application with the exception that the electricity is generated by sending the expanding fluid through a turbine rather than through a magnet and coil. But, the sections of the Brayton Bottoming System, i.e. compressor, expander, heat exchanger, are all similar.

The court has ruled the combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. __, __, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143).

Therefore, it would be obvious to a person having ordinary skill in the art to modify the self-pumping closed loop system in Redman with a closed loop system that operated in a batch

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style by adding valves because the valves force expansion when heated and creates liquid movement in a reliable and predictable manner.

Regarding claim 2, Redman teaches a ferrofluidic converter wherein the cross-sectional area of the HAC is larger than the cross-sectional areas of the outlet conduit, the inlet conduit, and the HDC (see fig. 4, col. 3, lines 20-29).

Regarding claim 3, Redman does not teach wherein the reservoir container has separate inlet and outlet valves. See discussion for claim 1 above regarding the reservoir being integral versus separable.

The inlet and outlet to the reservoir between the different configurations is a change of shape where all the functions of the reservoir remain identical.

The court has ruled that a change of configuration is a prima facie case of obviousness if the change of configuration does not modify the operation of the part (see MPEP § 2144.04 IV).

Therefore it would be obvious to a person having ordinary skill in the art to modify the inlet and outlet conduit from a partial portion of the reservoir of Redman to a separable reservoir with separate inlet and outlet conduits because both configurations serve to function for condensed fluid in and carrier gas plus magnetic particles out.

Regarding claim 4, Redman teaches a ferrofluidic converter wherein part of the inlet conduit has been routed such that it is connected to the outlet conduit; thereby forming a section of conduit that is common to both said input conduit and said output conduit, wherein said common section is the selected sections of both said input conduit and said output conduit and the electricity conducting wires are coiled around said common section of conduit (see col. 3, lines 47-50).

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Redman does not teach the inlet outlet is connected both above and below an outlet conduit. This is simply a change of configuration. The court has ruled that a change of configuration is a prima facie case of obviousness if the change of configuration does not modify the operation of the part (see MPEP § 2144.04 IV). The wires generate electricity and the conduit allows for fluid flow regardless of arrangement.

Therefore it would be obvious to a person having ordinary skill in the art to modify the conduit routing of Redman to the configuration cited because the conduit would function to circulate the ferrofluid.

Regarding claim 5, Redman teaches all the limitations of claim 1 but does not teach the converter further comprising:

- a) a booster container comprising a booster inlet connected to a second outlet of the HAC and a booster outlet;

- b) a booster conduit whose first end is connected to said booster outlet and whose second end is connected, through a one-way valve that opens as a result of the pressure exerted thereon by the ferromixture in said booster conduit, to the midsection of said HDC;

- c) valves located at said second outlet of the HAC and said booster outlet, the activation of each of which is controlled by the controller.

It is the examiner's position that the booster as claimed is simply an extension of the HAC subjected to a heat source. Again, it is a matter of being integral or separable. Both containers expose the fluid to heat and are connected in series within the conduit. Whether the ferrofluid is heated in one chamber, two chambers, or a dozen chambers is immaterial.

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Continuing claim 5, Redman teaches

d) Magnetic field generation elements (1030, for generating magnetic fields around selected sections of conduit; said magnetic fields having sufficient strength and being orientated such that the individual magnetic fields of essentially all of said magnetic particles will be aligned when said particles move through said selected sections of said conduit; and

e) Electricity conducting wires (105), coiled around said selected sections of said conduit, wherein electric current is induced in the coils of said wires by said aligned magnetic fields of said magnetic particles moving through said coils of said wires (see col. 3, lines 20-34).

The placement of the magnets and solenoid is a change in configuration. The court has ruled that a change of configuration is a prima facie case of obviousness if the change of configuration does not modify the operation of the part (see MPEP § 2144.04 IV). The wires generate electricity and the conduit allows for fluid flow regardless of arrangement.

Therefore it would be obvious to a person having ordinary skill in the art to modify the magnet and solenoid placement of Redman to the configuration cited because the magnet and solenoid would function to predictably to generate current.

Regarding claim 6, all limitations are recited in claim 4. See rejection of claim 4 above.

Regarding claim 7, Redman does not teach the converter further comprises a by-pass conduit, the first end of which is connected to the HAC through a valve and the second end of which is connected directly to the HDC.

George, Jr. does teach a by-pass conduit around the expander. Specifically, valves 23 and 120 are closed while valve 121 is opened resulting in the flow from the compressor by-passing the expander and directly to the heat exchanger (see col. 10, lines 55-58).

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The limitation stating wherein the purpose of said by-pass is to allow control of the velocity of flow of the circulating ferrofluid/ferrogas/ferromixture in the main circuit of said converter; said control including maintaining said velocity within a desired operating range, reducing said velocity, or completely stopping the circulation is intended use and does not further the structural limitation of the device and as such is not examined (see § MPEP § 2106).

Regarding claim 8, the limitation is a preferable location and therefore optional. An optional requirement does not further the structural limitation of the device and as such is not examined.

Regarding claim 9, Redman does not teach a converter in which the HAC is divided into two longitudinal sections, an inlet section connected to an outlet section through a one-way valve or filter, and the HDC is divided into two sections, an inlet section connected to an outlet section through a one- way valve;

wherein when the pressure in the respective inlet section exceeds the pressure in the respective outlet section, the respective valve opens allowing ferrofluid/ferrogas/ferromixture to flow from said respective inlet section to said respective outlet section.

George, Jr. does teach a compressor unit and heat exchanger unit wherein the compressor is divided into two longitudinal sections, an inlet section connected to an outlet section through a one-way valve or filter, and the heat exchanger is divided into two sections, an inlet section connected to an outlet section through a one- way valve;

wherein when the pressure in the respective inlet section exceeds the pressure in the respective outlet section, the respective valve opens allowing the fluid to flow from said

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respective inlet section to said respective outlet section (see col. 8, lines 30-35 and col. 7, lines 24-30).

George, Jr. teach multiple chambers in a heat exchanger allows more effective cooling and two compressor sections allow higher pressures at lower temperatures (see col. 8, lines 30-35 and col. 7, lines 24-30).

Therefore, it would be obvious to a person having ordinary skill in the art to modify the compressor and heat exchange portions of Redman into two or more steps because a higher pressure at a lower temperature can be achieved and the heat exchanger is more efficient.

Regarding claim 14, Redman teaches a ferrofluidic converter with an HAC and an HDC.

The limitation that the HAC is positioned on the top side of the wind wing of a sea wave energy converter and the HDC is installed on the bottom side of said wind wing is intended use and does not further the structural limitation of the device and as such is not examined (see § MPEP § 2106).

Regarding claim 15, all the limitations of claim 15 are recited in claim 1. See rejection for claim 1 above.

Regarding claim 16, Redman teaches a method wherein the electricity is generated by the following steps:

a) allow heat to be absorbed by the HAC, from an external heat source, thereby to increasing the temperature of the ferrofluid and carrier gas and the pressure inside said HAC;

b) allowing the high pressure carrier gas to push ferrofluid out of said HAC, said ferrofluid changing phase to ferrogas and releasing the suspended magnetic particles, which are carried through said outlet conduit towards said HDC by the ferromixture and carrier gas;

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c) utilize the high pressure in said HAC and said outlet conduit to force ferromixture, into the HDC, thereby raising the pressure of the gas in said HDC;

d) cooling said ferromixture in said HDC, thereby condensing the ferrogas in said ferromixture to ferrofluid;

e) when the difference in pressure in said HDC and in said HAC reaches a predetermined value, allowing ferrofluid and carrier gas to be pushed from said HDC to said HAC through said inlet conduit; commencing the next cycle of operation, by repeating steps a) to e); and g) in each cycle, aligning the magnetic fields of said magnetic particles as they pass through selected sections of said inlet and said outlet conduits, around which selected sections electricity conducting wires are coiled; thereby inducing electric currents in said coils of electricity conducting wires.

Redman does not teach the use of valves to control the flow.

George, Jr. does teach a ferrofluid generator that uses valves, for timely opening and closing of a bubble pump (see col. 8, lines 2-5).

See claim 1 for obviousness discussion.

Regarding claim 17, Redman teaches a ferrofluidic converter but does not teach wherein the converter additionally comprises one or more of the following: a) a reservoir container, connected by a conduit to the outlet of said HDC.

Redman, in a second embodiment (see fig. 6), does teach b) a reservoir container (209), connected by a conduit to the outlet of said HDC (portion towards solenoid 205 from heat pipe 202, with HAC opposite solenoid in respect to heat pipe 202); said reservoir allowing exchange

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of ferrofluid stored in said reservoir container with said main circuit (see col. 3, line 63 through col. 4, line 1).

The difference in the embodiments of Redman is making the reservoir separable from the main circulation system, rather than integral. The court has ruled that making a device integral or separable is a matter of engineering choice (see MPEP § 2144.04 V).

Therefore it would be obvious to a person of ordinary skill in the art to modify the reservoir in the cited embodiment of Redman by creating a second distinct reservoir as taught in the second embodiment cited in Redman, because having a second reservoir rather than a larger first reservoir results in the predictable result of both designs functioning as a source of condensed ferrofluid.

The examiner, given the choice of one of more, elected to examine the reservoir, selection (a).

Regarding claim 18, Redman teaches a ferrofluidic converter method wherein the electricity is generated by the following steps: a) allow heat to be absorbed by the HAC (109), from an external heat source, thereby to increasing the temperature of the ferrofluid and carrier gas and the pressure inside said HAC; b) allowing the high pressure carrier gas to push ferrofluid out of said HAC, said ferrofluid changing phase to ferrogas and releasing the suspended magnetic particles, which are carried through said outlet conduit towards said HDC (106) by the ferromixture and carrier gas; c) utilize the high pressure in said HAC and said outlet conduit to force ferromixture, into the HDC, thereby raising the pressure of the gas in said HDC; d) cooling said ferromixture in said HDC, thereby condensing the ferrogas in said ferromixture to ferrofluid; e) the difference in pressure in said HDC and in said HAC reaches a predetermined

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value, thereby allowing ferrofluid and carrier gas to be pushed from said HDC to said HAC through said inlet conduit; f) commencing the next cycle of operation, by repeating steps a) to e); and g) in each cycle, aligning the magnetic fields of said magnetic particles as they pass through selected sections of said inlet and said outlet conduits, around which selected sections electricity conducting wires are coiled (105); thereby inducing electric currents in said coils of electricity conducting wires (see col. 3, lines 20-34).

Redman does not teach the use of valves to control the flow.

George, Jr. does teach a ferrofluid generator that uses valves, for timely opening and closing of a bubble pump (see col. 8, lines 2-5).

See claim 1 for obviousness discussion.

Regarding claim 19, all limitations of claim 19 are recited in claims 1 and 5. See rejection of claims 1 and 5 above.

Regarding claim 20, all the limitations of claim 20 are recited in claim 7. See rejection of claim 7 above.

2. Claims 10-13 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Redman and George, Jr. as applied to claims 1, 5, 15, 17 and 18 above, and further in view of Weimer et al. (U.S. Pat. App. Pub. No. 2003/0208959).

Regarding claims 10 and 11, Redman does not teach a converter provided with a solar heat source.

Weimer et al. does teach solar as a heat source where one or more optical arrangements, including one that comprises a window (claim 11), located near one or more of the valves and/or

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in one or more of the conduits, i.e. tube, to raise the temperature of the fluid at the location of said optical arrangement (see paragraph [0043]). Weimer et al. teach the sun is an environmentally friendly, unlimited source of heat compared with carbonaceous fuels (see paragraph [0028]).

Therefore it would be obvious to a person having ordinary skill in the art to modify the heat source in Redman to be a solar heat source because solar heat functions as an unlimited known source of heat with an environmental benefit.

Regarding claim 12, Weimer et al. teach a solar heat source in which the window comprises an activated shutter, which is opened and closed by a control system according to conditions in the vicinity of said window (see paragraph [0064]). See claim 10 for obviousness.

Regarding claim 13, Weimer et al. teach a solar heat source in which the optical arrangement comprises a heliostat (see paragraph [0040]). See claim 10 for obviousness.

Regarding claim 21, Redman does not teach a solar heat source.

Weimer et al. does teach a solar heat source that comprises one or more optical arrangements located near one or more valves, i.e. inlet to reactor, said optical arrangements comprising shutters, said method comprising the additional step of opening said shutter at an appropriate time to increase the localized temperature of the fluid in the focal zone of said optical arrangement (see paragraph [0064]). See claim 10 for obviousness.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hsu (U.S. Pat. App. Pub. No. 2004/0182099).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jayne Mershon whose telephone number is (571) 270-7869. The examiner can normally be reached on 9:00 AM to 5:00 PM; alt. Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sines can be reached on (571) 272-1263. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLM

8/25/2009

/Brian J. Sines/

Supervisory Patent Examiner, Art Unit 1795